EINSTEIN'S RELATIVITY
WARPED MINDS, BENT TRUTHS

Einstein has been hailed for his relativity theories and has always had his detractors, but the consensus view is changing as more problems with his explanations of physical reality are exposed.

Part 1 of 2

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PART I: ANAESTHETISED BY THE AETHER: How a Few Failed Experiments Put Science in a Stupor

In a statement issued following the death of Professor Albert Einstein on 18 April 1955, US President Dwight Eisenhower said: "No other man contributed so much to the vast expansion of the 20th century knowledge." And this, 45 years before the close of the century. "Yet no other man was more modest in the possession of the power that is knowledge, more sure that power without wisdom is deadly. To all who live in the nuclear age, Albert Einstein exemplified the mighty creative ability of the individual in a free society," said Eisenhower.[1] *TIME* magazine lauded the scientist as "Person of the Century" on the cover of its 31 December 1999 edition.[2]

In his lifetime, Albert Einstein (1879–1955) gained scientific fame for theories such as On Brownian Movements, the Photoelectric Effect, the Bose–Einstein Statistics of Thermodynamics and, above all, the Special Theory of Relativity (STR) (1905) and the General Theory of Relativity (GTR) (1915–16). The Photoelectric Effect explanations won him a Nobel Prize in 1921.[3] Due to his inaccessible and often remote theories, Einstein became the symbol of the mystical scientist in the ivory tower. He was a gentle man, whose enigmatic looks and veiled utterances made him an ideal for scientists as well as for science-fiction writers and the person in the street.

Yet in his lifetime there were those who doubted his greatness, and more than 50 years after his death, when glory seemed secure, there are those who once more feel free to doubt whether everything is alright with relativity.[4] Here are some reasons why.

The Aether Controversy

The path to Einstein's mythical fame, and his eventual fall from grace, was via a devious substance known as the "aether". The aether was described in various works by Greek, Egyptian and Indian philosophers as early as the fifth century BC.[5] According to their ideas, the aether is the most subtle substance in creation—the mother of all other phenomena. Fifth-century-BC philosopher Anaxagoras also speculated that atoms are vortexes in the aether, a theory picked up 2,500 years later by the genius Scottish physicist William Thomson, alias Lord Kelvin (1824–1907).[6]

The very reason for reviving old concepts was because of certain advancements in science. By the early 19th century Michael Faraday and Hans Oersted had discovered electromagnetism, and by the middle of the century Dr Hermann Helmholtz (1821–94) had proved that such forces could spread through "empty space" as waves. Great men of science such as Michael Meyerson, Lord Kelvin and Robert Young competed to give the best explanations for these phenomena, but the man to win the prize for the best theory was James Clerk Maxwell (1821–79). In 1864 he proposed the theory of the "mechanical aether"—an invisible, ethereal substance endowed with elasticity and filled with small "idle wheels". Magnetism was pictured as vortexes in the aether, while electricity was imagined to be deformation of the vortexes and the wheels. By a continuous process of deformation and rotation, electromagnetism could be explained and expressed by four fundamental equations, known today as the Maxwell electromagnetic wave equations.[7]

These equations and the picture based on the theory of the "mechanical aether" became a veritable goldmine for 19th-century science: a host of phenomena found their true explanation, and light was finally explained as electromagnetic waves of ultra-short wavelengths.

Using such thinking, scientists now started to discuss the aether and three schools of thinking emerged. One claimed that the Earth traverses an immovable sea of aether, another that the aether is carried along with the Earth, and a third held that the aether is in motion. Discussions broke out between the schools, showing a need to prove who was right, but proofs rested on technical means and no reliable mechanical instruments were available until the 1880s when Professor Albert Michelson (1852–1931) from Case University, Cleveland, USA, built his one-millionth-part-accurate interferometer. Such an instrument could identify differences between two arriving light waves in terms of geometrical interference patterns—that is, patterns formed when beams of light hit the same spot, either amplifying each other or weakening each other depending on whether they arrive at the same time or slightly out of phase.

The idea behind the famous Michelson–Morley experiment was to send two beams of light along two different paths, equally long as measured by earthly measuring sticks, the only difference being their direction—one path being along the movement of the Earth through the "sea of aether", the other traversing the Earth's path. By mirrors and prisms, the two light beams would then be made to meet at the same spot. If those light waves travelling along the path of the Earth got an extra speed through the aether sea and those traversing the path were not influenced, they would arrive at different moments, provided that the aether waves we call light had different speeds in different directions. Thus the observer would see a weakening of the light as the waves arrived at different moments to create negative interference—somewhat like waves on the sea arriving out of order, creating weaker waves compared to those that roll in at the same time, marching in order, so to speak.

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Michelson acted according to this theory, being a true believer in the static aether, and his contention was that this static aether penetrated all objects, heavy and light, and would in turn influence the speed of the propagating light waves as described above. To test this idea, he set up his interferometer in the basement of the university building in an attempt to see if there was any difference between a light beam parallel to the movement of the Earth and one perpendicular to it. Michelson and his colleague Edward Morley (1838–1923) figured that the light beam going *against* the movement of the Earth would be slowed down, the one going *with* the Earth would be speeded up, while the one *traversing* the direction of the movement of the Earth would be unaltered. They reckoned that these differences should be detectable down to one in a millionth of a wavelength of light. After just 36 measurements over a period of three days, Michelson and Morley declared that there were detectable differences, but not great enough to support the theory of a static aether.[8] This was later to be known as the famous "1887 zero- result experiment"—but did it really produce zero result, and what did it prove or not prove?

Shrinking Science

Great minds were at a loss, since neither the *entrained* aether (aether that moves with the Earth) nor the *static* aether was properly proved. In 1892 Hendrik Lorentz (1853–1928), one of the proponents of the static aether theory, suggested a way to explain the zero-result experiment. He asked what it would take in the change of distance travelled by light to keep the formula for the "speed = distance / time" constant under all conditions. The answer was a surprising formula, where lengths shrink and time goes slower by the same factor. When he divided shrinking lengths by slowed-down time, the result was "c", confirming the constancy of the speed of light.

This was not, however, a mere mathematical trick to save the day: Lorentz firmly believed that physical shrinking really took place. The material "bolts and wheels explanation" was that matter consists of atoms and that the radius of atoms is determined by the size of the orbit of the outer electrons—later called the "Bohr radius". When atoms of matter speed through the immutable aether, electrons experience an aether-resistance and their orbits get compressed so that they are no longer circular but elliptical, with the shorter axis in the direction of movement. The shortening of the axis is calculated by the Lorentz formula for shrinking.[9]

In practical terms, what Lorentz was saying was that Michelson's steel interferometer had experienced a minute shrinking in the direction of the Earth's movement through the aether. Thus light beams travelling along this axis had a shorter way to go, and since c = distance / time, c appeared to be constant since time had slowed down by the same factor as the length had shrunk.

Suddenly it could be explained to the moving scientist why he would measure the same speed of light as one who was floating in a stationary spaceship in the aether. But is this what was proved? Was there any truly cosmic, motionless aether, or was it an entrained aether that travelled with the solar system? Or what was going on?

Later, French mathematician Henri Poincaré (1854–1912) started to see things differently: maybe it was a case of how we view this world. Many baptised this viewpoint the Lorentz–Poincaré Theory of Relativity.

A Patent Solution?

In 1905, a patent clerk by the name of Albert Einstein, working at the Swiss Patent Office in Bern, sent three articles to the German journal *Annals of Physics* concerning Brownian movements (movements of particles in water), the photoelectric effect and the zero-result experiment of Michelson and Morley. The latter came to be known as the Special Theory of Relativity. Einstein didn't bring much that was new into the aether discussion with his theory, except for two new postulates that he hoped could kill the whole aether controversy: (1) the speed of light is a universal constant, take it or leave it; (2) there is no such movement as absolute speed relative to a universal, resting aether, thus all movement is just a measurement of difference in speed between moving bodies. From these two initial postulates, it was possible to arrive at the Lorentz transformations as a consequence of how we observe things.[10]

By the 1930s, Einstein had become a household name, and journalists became interested in how he had come upon his ideas. In traditional Einsteinian style, he claimed that he did so on a purely philosophical basis: "Physics constitutes a logical system of thought which is in a state of evolution, whose basis [principles] cannot be distilled, as it were, from experience by an inductive method, but can only be arrived at by free invention. The justification [truth content] of the system rests in the verification of the derived propositions [*a priori*/logical truths] by sense experiences [*a posteriori*/empirical truths] ... Evolution is proceeding in the direction of increasing simplicity of the logical basis [principles] ... We must always be ready to change these notions—that is to say, the axiomatic basis of physics—in order to do justice to perceived facts in the most perfect way logically.[11]

Einstein soon changed the story in his booklet *Essays on Science*, admitting that he accepted the Lorentz transformations as the only solution to make the speed of light in the Maxwell equations appear constant to all observers—exactly as Lorentz and Poincaré had speculated!

Thus, according to mathematician Edmund Whittaker:[12] "Einstein had published a paper which set forth the Relativity Theory of Poincaré and Lorentz with some amplifications, and which attracted much attention!" When confronted with these allegations, Einstein denied them as irrelevant—but were they irrelevant?

Was it possible for one interested in Lorentz's and Poincaré's work not to have noticed that they had started to change the interpretation of the original equations from a real physical phenomenon to one concerning information?

"But matter is *not* transformed into energy; matter is essentially composed of protons and neutrons, and in atomic fission the nucleons do *not* disappear but are found in the fission products."

Einstein in Wonderland

Relativity theory seemed to contradict common sense when interpreted the Einsteinian way. Apart from making the speed of light, "c", a universal constant, it leads to some strange results concerning the way we experience the world when using light as a primary source of information.

Time on a moving object seems to slow down, and scientists believing the new message assumed that if you put a man in a rocket and sent him into the universe at sufficiently high speed, he might never grow old. But according to Einsteinian wisdom, all movements are relative, so the man in the rocket may believe it is the Earth that is moving and he feels that he is the one losing out on time. In the havoc created by such arguments, even Einstein seemed to forget his original premises. These phenomena were not real: they were apparent because all information between the two—the astronaut and the Earth—was transmitted by signals going at a finite speed, "c". It was not about space at all: it was about transmission of information![13]

Along the same line of thinking, information about lengths also changed: lengths seemed shorter in the moving body. According to the original Lorentz interpretation, they did indeed become shorter. But Einstein argued that it was only an illusory effect caused by the way we measure distances by the use of signals going at finite speed, emitted from objects moving past the observer. One would expect that if it's an optical illusion, it would be possible to photograph the effect; but Einstein denied this, as no one in his time had actually attempted to do so.[14]

Whereas clocks seem to tick slower and lengths seem to shrink, mass in the Relative Wonderland seems to increase and become heavier—for the observer at rest. But of course, all is relative, so the man in the spaceship will claim that it is Earthlings who are getting heavier. So, who is putting on weight?

Of special interest are pions moving at impossible speed. According to calculations performed independently by British astronomer/physicist Sir James Jeans (1877–1946)[15] and by the lesser-known Italian industrialist Olinto De Pretto (1857–1921) in 1904, their mass is exactly equal to mc^2, where "m" is the hypothetical mass of the photons. Einstein extended this idea to concern all moving bodies by ascribing to them a "resting energy" of $E = mc^2$. When asked what was the glory of the Special Theory of Relativity, he specifically named the energy formula. But was it his own? And can all matter indeed be transformed into pure energy?

Later, when the nuclear bomb was produced—after Einstein had signed a petition for its construction—many scientists claimed to have used the $E = mc^2$ formula as a basis for releasing the potential energy of the atom. Or was the energy calculation actually based on other, more complicated formulas?

According to French professor of chemistry C. Louis Kervran (1901–83) in *Biological Transmutations* (1962), this formula can never be applied to the atomic nucleus because "...it is a mistake that matter can be transformed into energy. The statement is false, even though it is found in practically all books on nuclear physics. We know only how to use the bonding energy between nucleons (which seems to come from mesons). But matter is not transformed into energy; matter is essentially composed of protons and neutrons, and in atomic fission the nucleons do not disappear but are found in the fission products. If some neutrons are expelled, they are not destroyed. For matter to disappear, it must be opposed by antimatter."

Backward Thinking

In 1906, Professor Hermann Minkowski (1864–1909), Einstein's old teacher who had scornfully called him a "lazy dog" a few years earlier, presented a new idea to Einstein. If the Lorentz transformations were correct, then they presented a rotation in a four-dimensional mathematical "space" (the proper term being "manifold", not to be confused with the concept of space used to mean a room, nature or the cosmos). The "space" he was thinking of was not our physical "outer space", but a mathematical construct of four equally important distances that can be measured with the same yardstick: height, length, breadth and the distance travelled by light in a certain period of time (light distance = c x seconds).

To make things clearer: mathematical space starts out with the experiences of the three dimensions of length, height and breadth when discussing space, and then makes a picture of the outer space on paper and starts making formulas for how to go around when measuring distances and describing objects located in this paper-space that is an abstract of real space. It is all paperwork where the paper-world corresponds to the experiences we have in the real world. In this paper-world, we deal with known topics such as distance, movement, volumes, shapes, surfaces, etc., and establish formulas or, rather, rules for how to express these tangible magnitudes known to our senses.

It is all "a piece of cake", even when maths goes sour, because real life is there as a reference. But what if we go beyond the premises of our concepts and, for argument's sake only, add another dimension, another measurable yardstick to our three dimensions, and make it 4D: length, breadth, height plus "something else". This something else can be measured with the same yardstick as the three others, but what is it? In real life, there is nothing compared to it: it is a mental construct. But we can apply the same rules to 4D as to 3D, and play with ideas in 3D.

To make things easy on mathematics, one uses a system of measurement of speeds where the speed of light is equal to unity (c = 1) and all other speeds are presented as a percentage of c (v' = v/c). Miraculously, it seems one has created "space-time" by forgetting that "c", just a few minutes ago, was measured in kilometres per second and now appears as unity: one (1). So beware: it is not space-time after all: it is space-light-distance and nothing but a simple paper-world suited for easy calculations.[16, 17] It is in such a paper-world that all movements appear to spread out nicely as time-space paths, and one can backtrack to gain knowledge of the "past".

Few scientists were happy about this and still fewer understood the use for it. Michelson admitted openly that he did not grasp the meaning of the new ideas—but a young Swiss scientist, Walter Ritz, did!

Being a specialist in optics and interferometry, Walter Ritz (1878–1909) offered to restore some sanity.[18, 19] He claimed that if we assume that all radiation loses some energy as it traverses space, this could account for a vast majority of phenomena, explain the Michelson–Morley zero-result experiment, save Newton from embarrassment and bury Einstein's theoretical fundament.

After publishing his General Theory of Relativity in 1916, Einstein still refused to accept that galaxies spin.

Because Einstein's two postulates were insufficient to support his STR, as he admitted in later years, one had to assume two other postulates not presented in 1905: that all information transmitted by radiation must be reversible, paving the way for backward time, and that space must bear no impression of what is going on—i.e., the world must be without memory!

However, if radiations are an irreversible process, as Ritz argued in 1908–09, time becomes irreversible and knowledge of real space depends on direction. Thus, if some history of events is lost forever and our world becomes inhomogeneous (anisotropic), the rug is pulled from under the Einsteinian thought-world.

Einstein, who was regarded as a genius by his admirers, could find no good counter-arguments to defend his theory against these arguments and somewhat lamely accepted Ritz's criticism but without changing his own theories.

In 1909, Walter Ritz died, and Einstein and the believers in the "new physics" were all too eager to forget his name and the embarrassment he had created.

Many years later, as quantum physics came of age, proponents of this new atomic theory admitted that Ritz's ideas were 100 per cent in accord with quantum physics; Einstein's were not: time is irreversible and tomorrow will forever be different from today. But in the paper-world of Einstein, these facts were only regarded as "ugly trees" in the garden of "pure marble".[20]

And moreover, if Einsteinians were to have been believed, they could have found the "holy grail": perpetual creation out of a limited amount of matter!

Afraid of Vertigo

As Einstein's theories gained a foothold with the younger generation of believers in the "new physics", Einstein's fame increased steadily and the stature of the aether scientists seemed to die out accordingly.

But in 1913, French scientist Georges Sagnac (1869–1926) took Einstein's second postulate to the slaughter-house by mounting an interferometer on a spinning disc and proving that there is a definite difference between light going with or against the direction of rotation. This difference could be easily explained by using old-time Newtonian arguments that the speed of light changes according to the direction of rotation.[21] This not only killed the second postulate, it killed the whole of STR.

Again, Einstein ran short of arguments and was once more unable to defend himself. Instead of dissecting Sagnac's mathematical analysis, he just sent a "short note" stating that the whole phenomenon was due to a "Doppler effect" (a change of frequency due to movement of the source)![22]

For the moment, Einstein thought he had saved his reputation but all he had done was to prove his own incompetence. When, as late as 1925, Michelson and Gale repeated the Sagnac experiment using the spinning Earth as their laboratory, their results once more confirmed rotation as an absolute type of movement. Einstein, who was by then a Nobel laureate, did not do anything to save the sacredness of his postulates.[23]

But Sagnac and, later, Michelson and Gale had actually proved nothing new that Einstein ought to have been confused about! They had just proved what Galileo and Copernicus had claimed 300 years earlier: that rotation is not relative movement: it is absolute.

By simple means, any man on a spinning planet can realise that his world is going round, utilising simple means such as those used in 1854 by the French physicist Jean Bernard Léon Foucault (1819–1868). Using a pendulum suspended from the ceiling of the Panthéon, anyone living in Paris could observe how the rotation of the Earth made the pendulum perform strange patterns in sand on the floor. Thus, claiming that the Earth is spinning and the heavens are still is by no means identical to holding on to the belief that the heavens spin and the Earth is at rest.

Unknowingly, as incredible as it may seem, Einstein had claimed exactly this, reviving the cosmology of Ptolemy from the first century AD.[24] Maybe he had been in a rush creating his theory?

After publishing his General Theory of Relativity in 1916, Einstein still refused to accept that galaxies spin. He claimed that this counteracted his second postulate in the STR. Sadly for common sense, all astronomers by 1916 knew that galaxies spin.[25]

Years after Einstein's death, opinion is still in favour of Sagnac and the absolute nature of rotation. When satellite clocks are synchronised, corrections are made using a speed of light either greater or less than "c".[26]

And today, spaceships, satellites and aeroplanes all carry laser-ring gyroscopes that use the non-relativistic Sagnac effect to tell the speed between the aeroplane and the rotating Earth, with accuracies down to nanoseconds.[27]

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Endnotes

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Dr Øverbye supports the notion that the aether is a key concept in both physics and energy medicine. This interest led him to investigate how Einstein prematurely killed a useful concept and may have contributed to more problems than solutions.

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